



Mode of Operation :

Starcore Screw compressor packages serve to compress refrigerants such as ammonia, R22 or R134a

Refrigeration Circuit :

The screw compressor draws in refrigerant vapour via the suction check valve and suction filter and then discharges the compressed vapour into the plant via the oil separator and discharge check valve.

The suction check valve prevents sudden pressure equalization with the suction line after shutting down the screw compressor package.

The discharge check valve prevents refrigerant from re-condensing in the oil separator.

The suction filter prevents dirt particles entrained in the suction flow from entering the compressor. The filter element features a very large filtering surface, which is provided by the star-type folding of the element. The mesh size is 60µm.

Gas oscillations, which can arise in the compressor compression chamber at high-pressure ratios during near zero delivery, are avoided by a gas oscillation protection device. This consists of a pressure equalization line between the oil separator and the compressor working chamber.

Oil Circuit :

The screws compressors are run with oil overfeed. Refrigeration compressor oil is fed to the compressor during the compression process for lubrication, sealing, noise reduction and to remove some of the heat of compression. After the compression process, the oil is separated from the refrigerant in the oil separator.

Oil Separation with refrigerant-unsoluble oils (standard refrigerants: ammonia; R717)

The refrigerant/oil mixture is fed into the front part of the horizontal oil separator where the first stage of separation is carried out using a combined agglomerator / demister. The front part of the oil separator is also used as an oil receiver.

The fine separation of the aerosol-type oil portion from the refrigerant is carried out in the upper part of the oil separator by means of coalescing cartridges. The oil separated in the fine section of the oil separator is returned to the compressor connection port

Oil Cooling :

Before the oil, which has been heated in the compressor, can be returned to the compressor for re-use, it must be cooled to a temperature that ensures a sufficient oil viscosity.

Oil Filter :

After cooling, the oil passes into the oil filter, which holds back solid particles from the full oil flow. One part of the oil is direct conducted into the rotor space for cooling, the other part of oil returns to the screw compressor for further oil supply.

The glass fiber element has, due to its large surface area, a large retention capacity and therefore a long service life. The filter has a fineness of 10 - 15 µm.

Oil Circulation :

This takes place by oil differential pressure between the suction and discharge.

Safety Devices :

The following safety devices are fitted to every standard screw compressor package:

- Safety devices to prevent the discharge pressure from being exceeded
The compressor control device switch off the drive motor when the discharge pressure limit has been exceeded.
- Safety device to prevent the difference pressure between discharge pressure and oil pressure after oil filter from being exceeded.
- Safety device to prevent the differential pressure between the oil pressure after compressor start up and the compressor discharge pressure from falling too low
- Safety device to prevent the discharge temperature from being exceeded.
- Safety device to prevent the oil temperature from being exceeded.
- Compressor drive motor safety devices Rated Current limitation is provided by the present compressor control system. When the rated motor current is exceeded, the compressor capacity control slide is driven in the MIN direction until the motor current reaches an allowable level.
- Thermistor which shuts down the compressor drive motor when its winding temperature limit has been exceeded.
- Check valve - suction side protects the screw compressor package from sudden pressure equalization with the suction line after shut down.
- Check valve-discharge side prevents refrigerant re-condensing in the oil separator.
- Oil pressure regulating valve regulates the oil differential pressure between the oil pump suction and discharge sides.

Monitoring Devices :

The following operating values can be continually indicated and monitored on the control device display:

- Suction pressure
- Discharge pressure
- Oil pressure - oil circuit monitoring
- Discharge temperature
- Oil temperature
- Motor current
- Differential pressure between oil pressure and discharge pressure (oil circuit monitoring)
- Differential pressure between oil pressure after oil filter and discharge pressure (oil filter monitoring)

The following operating values are indicated on the control device display:

- Suction temperature
- Absolute primary slide position
- Saturation temperature of suction pressure
- Saturation temperature of condensing pressure
- Number of running hours
- Set point of controlled value in °C
- Real point of controlled value in °C
- Used refrigerant
- Controlled variable

Capacity Control :

All screw compressors used in the package series are fitted with a continuous capacity control with a range of 25 - 100%.

The position of the control slide is indicated by the position transducer and reported on compressor control device.

The hydraulic slide adjustment is controlled by two solenoid valves, which are contained in one block and mounted direct on the screw compressor.

During start-up of the screw compressor package, a differential pressure is created between the suction and discharge side of the machine, which enables oil flow through, system. Parameters are controlled through ODP1 and ODP2 on the microprocessor controller.

One of the start-up requirements for the compressor drive motor is that the control slide of the compressor be in its MIN end position. The MIN end position is adjusted via a strain-spring during compressor stand still.

If the control slide of the compressor is not in its MIN end position, the command to reduce capacity is given and the control slide is driven to its MIN end position.

The solenoid valve block can be used for all compressors with fixed V_i at all operating conditions.

The solenoid valves are pulsed by the control system.

Starcore screw Compressor Package uses all valves and flow controls from Danfoss / Hansen or equivalent. The Package Controller is customized through CARYSOFT programme for system operation and control. The Logic Controller is SCADA enabled capable of getting hooked to any BMS system.



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